STORY TELLING: A TOOL IN TEACHING SCIENCE

Pratibha Kumari,
Sjrm College Of Education, Lohar Majra, Kurukshetra
Haryana, India.

ABSTRACT

Constructivism assumes that learners construct their own cognitive structures (knowledge) as they interpret their experience in a particular situation (Palincsar, 1998). Vygotsky, a social constructivist believed that social interaction, cultural tools and activity shape the individuals' development and learning. The learner through interaction with the world and social negotiations, explore the outside world and make changes in their already existing understanding of the external world. Story telling had been used as social tool for communicating facts from one generation to another which had helped individuals to understand and build accurate representation of the external world. In formal education system, story telling has been widely used in literature classes for making students correlate with the external world but science teaching has always been based on inductive reasoning, experimenting and analytical thinking. In this paper the authors elaborate upon how story telling can be used as a tool in teaching science.

Key words: Story telling, tool, Science teaching

Introduction

In the conventional science classrooms, the process of teaching and learning often proceed with delivery of facts and asking students to memorize the facts in order to understand different concept of science (Zaitun, 1997). Science teaching has always been based on inductive reasoning, experimenting and analytical thinking and usually lack creativity which may result in gradual loss of interest of students in learning science because they may believe that science is boring and difficult to understand. This is where stories could be used to capture their interest in learning science. Children are naturally, lovers of stories. However, stories and storytelling have not been widely used in science classrooms. As we shall see there are many advantages of using stories in science classrooms. One of the

advantages of using stories in science classrooms is because stories have the potential to engage pupils in the lesson better than the plain regurgitation of scientific facts. Wells (1986) argues that stories are underused and their importance is only recognized within the narrow confines of creative writing and even though stories are used in the classrooms, it is often as a way of filling odd moments when the "serious" work has been completed. Similarly, Grainger (1997) argues that storytelling is not often valued as part of the educational enterprise and is merely used in the classrooms as gossip or off-task talk. Science teaching has always been based on inductive reasoning, experimenting and analytical thinking, but if we use story telling with other methods to teach science it can be very it can very successful. This paper elaborates upon how story telling can be used as a constructive approach to make science teaching more interesting.

Enhancing students' thinking skills, logical reasoning, and scientific attitude has always been a considerable challenge in education. Vygotsky, a social constructivist described that knowledge is constructed based on social interaction and experience. Knowledge reflects the outside world as filtered through and influenced by culture, language, beliefs interactions with others, direct teaching and modeling. Guided discovery, teaching models, and coaching as well as the individual's prior knowledge, beliefs and thinking affects learning (Palincsar, 1998). A constructive approach to education emphasizes upon the learners, and how they construct representation of reality through their interaction with the world and their discussion with others (Bruner, 1986). Most of the time our interactions with the world are not direct, our understanding about the happening is constructed through reflection on it with others. Bruner (1986) suggests that we need to encourage a situation whereby information is not presented from one dominant view and where reflection, discussion and opposing views are included in the process.

Science teaching and Constructivism

Social constructivist asserts that knowledge is actively constructed by learner in social situations. Constructivism in science teaching emphasizes upon the student centered approach in which each student is given value for his or her individual difference and treated as a unique personality Tandon, (2011). Each learner is provided with opportunities to

explore, observe and discuss his perceptions with the teacher. Students should be encouraged to ask questions, share their experience, carry out analogies and reach conclusions to draw inferences. Constructivism sees learning as a dynamic and social process in which learners actively construct meaning from their experiences in connection with their prior understanding and social settings (Diver, Asoko, leach, Mottimer & Scott, 1994). The constructivist argue that student do not come to science class empty handed but arrive with lots of strongly formed ideas about how the natural world works. In the view of constructivists the learner should no longer be passive recipients of knowledge supplied by teachers and teachers should not be repositories of knowledge and classroom managers (Fosnot, 1991). From, this perspective, learning is a process of acquiring new knowledge, which is active and complex and class room is unit where this knowledge is constructed and socially negotiated (Glynn, Yeany & Britton, 1991).

The model of learning given by Moons (2005) explains that we cannot actually see that learning has occurred or not, we can see only the results of learning which can be termed as the 'representation of learning'. The same area of learning might be represented in different ways – writing, oral account, and graphic display and so on and it is through the description of the representation of learning that we identify the stages of learning. Moons (2005) described the stages of learning as:

Noticing - Noticing is the least detailed form of learning. We cannot learn something if we do not notice it at some level (which could be unconscious). We notice things, form their representation in our mind & memorize them. These representations are modified only by the degree to which we forget them.

Making sense– It is getting to know the material as coherent, but only in relation to itself. Facts which are perceived through senses may be fitted together like a jigsaw but not related to previous understandings. Representation is coherent reproduction, but not related to other ideas and is not processed.

Making meaning –Making meaning means that there is a sense of meaningfulness but there is not much evidence of going beyond the given. Representation of ideas is integrated and well linked. There is the beginning of development of a holistic view.

Working with meaning Involves going beyond the given representations and linking it with other ideas. There is the creation of relationships of new material with other ideas. Representation is reflective, well structured and demonstrates the linking of material with other ideas which may change as a result.

Transformative learning– This process gives the evidence that the new learning has transformed current understandings in reflective processes. Representation demonstrates strong restructuring of ideas and ability to evaluate the processes of reaching to learning. There are creative / idiosyncratic responses.

Our capacity to express ourselves through narrative forms not only enable us to reshape reassess and reconstruct particular event, but it also allow us to learn from discussing our experience with others, who may raise alternative view, suggest imaginative possibilities and ask stimulating questions. McDrury and Alterio (2003) developed a five stage model of learning through story telling based on Moons' (2005) five stages of learning

Stage 1 Story finding (Noticing, turning into) : In this step the teacher presents a story that raises developmental issue or make student find and present a story on specific topic that interest them

Stage 2 story telling (Describing, deconstructing): The teacher act as guide to help student to make initial sense of the story by questions like, what is this story about, what question does it arise for you? How does it make you feel?

Stage 3 Story expanding (Reflecting on, making meaning) in this stage the teacher helps the student to reflect on deeper meaning of the story. For example: Why is the person in the

story living in this way? How is this similar to your life? How is this different to your life? How would you feel in their position?

Stage 4 Story proceeding (Working with meaning) in this stage the teacher helps the student to develop self awareness about the surrounding of the event, give description of the event, critically analyze the event which means examining the relevance of existing knowledge, challenging assumptions and imagining alternatives, teacher help the student in finding new meanings, new perspectives & making judgments about the value of something.
Stage 5 Story reconstructing (Imagining alternatives) here the teacher helps the students to explore how they might be activist and take stance to do something to change the story.

Rationale of using storytelling approach in science lessons

Stories are potentially one of the most powerful tools to be used in teaching science. There are many benefits that teachers of science can gain from using stories as one of the alternatives in teaching. Osborne (1997) argued that practical activities are not the only strategy of doing and learning science since there are many more strategies that can be used by science teachers in the classroom. For example, utilizing discussion in small groups among the students may be very helpful.

1. Stories as a Starting Point

This kind of discussion can be carried out if the teacher uses a form of story to stimulate the children's thinking of a certain science concept. For example, a teacher may use a story about a famous scientist, Sir Isaac Newton to begin the lesson on 'gravity', where she/he tells about how he firstly thought about gravity from an apple falling from a tree. He/she can then pose questions to the children about the nature of gravity and this could lead to further activities such as discussion about gravity acting on different objects.

2. To help explain abstract ideas or concepts

Secondly, stories could be used to explain abstract ideas or concepts of a general principle or as an illustration. This is supported by Wells (1986) who argued that story telling is one of the most fundamental means of making meaning; as such it is an activity that pervades all

aspects of learning. The findings of one study by Banister & Ryan (2001) showed that children remember abstract science ideas better when taught in a story format and they could also distinguish the real from the anthropomorphic (the attribution of human characteristics to objects). The use of anthropomorphic thinking in science education is worrying for some educators, however Tamir & Zohar (1991) believe that the use of anthropomorphism should not raise concern since many children are able to distinguish between anthropomorphic and factual reasoning. For example, in teaching water cycle, Banister & Ryan (2001) develop a story which they called 'The Great Journey of William Water'. In their study, water molecule was given human attributes such as feelings and gender. In their story, William (the water molecule) evaporated up into the air and "when he was evaporating into the air, and he said 'Wheee' because he thought he was flying".

3. Scientific explanation as analogous to 'stories'.

Ogborn et al. (1996) proposed a significant contribution in their book on "Explaining in the Science Classroom" which identifies science explanation itself as being analogous to stories in which there is a cast of protagonists that must be 'talked into existence' . In this case, there are no human actors involved in science explanation; the protagonists are the entities (for example elements or atoms) as well as mathematical constructions such as velocity that need to be explained like a story. Ogborn et al. (1996,) state that: One way to transform knowledge is to turn it into a narrative. Stories, like discovery of penicillin or a personal experience can act as effective "knowledge carriers". The narrative relations in the story match the conceptual relations to be understood, and make them memorable and easily recoverable.

4. Storytelling as a dialogic process

The stories told directly (referred to as "storytelling) in science teaching involve a process of interaction between a teller (teacher) and an audience (students). Telling of a story is also a dialogic process in which an individual is trying to make sense of the story being told on a social plane. Solomon (2002) argues that a story itself is like a dialogue which not only involves a teller telling a tale, but also the listener who has a part to play in the narration, even though only one voice is heard from start to finish .

Storytelling is a valuable skill in the teaching and communication processes which are vital to teachers The ability to hold attention and engage listeners in a story is central to good teaching, learners learn in more holistic and memorable ways from a story told to them. This approach was used by pupil teachers of Shri Jai Ram Mahila College of Education, Kurukshetra during practice teaching session at Keseri Devi Lohia Jai Ram Public school, Kurukshetra. Instead of starting the class in usual inductive method the pupil teacher narrated the story about how a algae and a fungus lived together and correlated it with the concept of symbiotic relationship. The process helped the pupil teacher to develop not only the aesthetic sense of the students but also the affective domain which is seen as most neglected aspect in learning in science teaching. The use of figurative language, to explain aesthetic ideas can be combined with logical analytical reasoning of science. This support the constructive point of view cementing the fact multiple realities and multiple understanding can coexist

The pupil teacher stated the lesson with the story that long ago there was a fungus named Manas. Manas Fungus was very good at building houses, but he wasn't a very good cook. In fact, he couldn't even make his own food; like all funguses, he had to find dead plants or animals to eat, and sometimes he couldn't find much food. One day, while Manas Fungus was sitting on a tree stump, he looked over at a rain puddle and saw something green growing there. The green thing looked up at him and smiled.

"What's your name," the green thing said.

"I'm Manas Fungus. What's your name?"

"I'm Meena Algae and I was just making some food out of sunshine. Are you hungry?"

Manas Fungus blew right over there, and people say that Manas Fungus and Meena Algae took a liking to each other. They decided to get married. And from them on, Manas

Fungus would make a house and Meena would make food and they could live wherever they wanted, as long as there was sunlight.

That's why to this day, when we see a lichen plant, we tell the symbiotic story of a fungus and an alga that fell in love. Keep that in mind the next time you see lichen on a rock. Thus an analogy was formed between the married life of the fungus and algae in the story and the symbiotic relationship of algae and fungus in lichens.

There are various ways and methods by which we can make the teaching of science interesting and effective. We must keep on trying new methods and challenge our thinking so as to come out of the bubble immune to making changes in the traditional methods of science teaching & go beyond it.

References

1. Banister, F., & Ryan, C. (2001), Developing science concepts through storytelling. *School Science Review*, 83(302), pp.75 – 83
2. Bruner, J. (1986), *Actual Minds, Possible Worlds, Cambridge, Harward University Press, Massachusetts.*
3. Diver, R; Asoko,M; J. Leach; E. Mortimer and P.Scott (1994), *Constructing scientific knowledge Cambridge, M.A Harward University Press.*
4. Fosnot, C. T. (1991) Constructivist: A psychological theory of learning. In C. T. Fosnot ed., *Constructivisim: Theory, Perspective and Practice* pp. 8-13. New York: Teacher College Press.
5. Glynn, S. M., Yeany, R. H., & Britton, B. K. (1991) A constructive view of learning science. In S. M. Glynn, R. H. Yeany, & B. K. Britton ed., *The Psychology of Learning Science* pp. 3-19. Hilldale, New Jersey: Lawrence Erlbaum Associates.
6. Grainger, T. (1997), *Traditional storytelling in the primary classroom. Warwickshire: Scholastic Ltd.*
7. Mc Drury,J. & Alterio, M.(2003), *Learning through Storytelling in Higher Education: Using Reflection & Experience to Improve Learning Kogan Page, Landon*
8. Moons, J. (2005) *Reflection in learning and professional development, Kogan Page, Landon* ISBN 0749440384, 9780749440381
9. Moon, J. (2005), *A handbook of reflective and experiential learning: Theory and practice. Abingdon,England: Routledge.*
10. Ogborn, J., Kress, G., Martins, I.. and Mc Gillicuddy, K. (1996), Explaining *science in the classroom Open University Press, Buckingham.*
11. Palincsar A.S, (1998), Social constructivist perspectives on teaching and learning *Annual Review of psychology*, 1998, 49:345-375
12. Schank, Roger, C. and Abelson, Robert. P. (1995), *Knowledge and Memory: The Real Story. Cogprints Landon*

13. Solomon, J., Duveen, J., Scott, L. & McCarthy, S. (1992), Teaching about the nature of science through history: action research in the classroom. *Journal of Research in Science Teaching* , 29(4), 409 - 421.
14. Tandon, A. (2011), Story telling-a constructive tool in science teaching, *School Science*, (49), 2 4-8.
15. Tamir, P. and Zohar, A. (1991), Anthropormorphism and teleology in reasoning about biological phenomena. *Science Education*, 74(285), 61 – 66.

16. Wells, G. (1987),*The meaning makers: children learning language and using language to learn. London: Hodder and Stoughton.*

17. Zaitun B. H. M. T (1997), Focus on the teacher: The transfer of knowledge from teacher education into the classroom. Paper presented at the international conference on Science, Mathematics & Technology Education, Hanoi, Vietnam.